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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,543	11/26/2003	John R. Wootton	09813970-1635	9738
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CHICAGO, IL 60606-1080				
EXAMINER				
HANDAL, KAITLY V				
ART UNIT		PAPER NUMBER		
1723				
MAIL DATE		DELIVERY MODE		
12/06/2010		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/723,543

**Applicant(s)**

WOOTTON ET AL.

**Examiner**

KAITY V. HANDAL

**Art Unit**

1723

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 September 2010.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 18-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 18-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/22)
- Paper No(s)/Mail Date \_\_\_\_\_

- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 18-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gee (US 2,630,378) in view of Wright et al. (USP 5,141,823).

Regarding claims 18-35, Gee discloses an apparatus for generation of synthesis gas comprising: a hydrocarbon (15), a water feed (34); a supercritical water (SCW) reactor (19); further including an oxygen feed (10) into the SCW reactor (19) (Gee reactor operates under supercritical temperature pressure conditions) (col. 4, lines 17-31 and col. 6, lines 72-col. 7, lines 1-2); a water-gas-shift reactor (col. 2, lines 10-20); at least one preheater (17 & 18) (as illustrated) in thermal communication with said water feed (34) and said fuel (15) (Gee does teach that the oxygen stream comprises also a percentage of water/high temperature steam) (col. 2, lines 42 – col. 3, line 1 and col. 4, lines 65 - col. 5, line 2), and configured to heat water from said water feed (34) to a temperature of 730°F (col. 5, lines 64-69), and fuel from said fuel feed (15) to a predetermined temperature (200-800°F) equal or greater than the critical temperature of water (=374°C) (Gee's temperature range above overlaps with the instantly claimed temperature range) before the water and the fuel are mixed (as

illustrated) (col. 4, lines 17-22); the preheated fuel, air and water continue to mix in mixing means/( near the inlet of reactor (19)); also, Gee illustrates that water (34) can premix with oxygen (10) (via line 33) and that fuel (15) can premix with oxygen (10) (inside 13), which is similar to the instantly claimed mixing means (see instant specification, page 11, last 4 lines).

Gee further teaches wherein his apparatus comprises a sensor and control system for monitoring at least one of said synthesis gas and said output gas and adjusting said feeds based on said sensing – Gee is concerned with hydrogen yields, he explains that the maximum desirable hydrogen yield is dependent upon the reaction temperature in reactor (14) which is in turn dependent upon the O/C ratio; therefore, the feed rates of oxygen, steam, and hydrocarbon need to be controlled (see for example col. 3, lines 17-56). Therefore, it would be obvious that the apparatus disclosed in Gee would require hydrogen sensors (which can comprise a chromatograph) in order to provide the data necessary for controlling the reaction temperature via controlling the feed rates.

While the reference teaches that the produced synthesis gas can be used for hydrocarbon synthesis (col. 2, lines 10-20), it does not disclose another means of using said synthesis gas for energy generation, namely using it in a fuel cell. Since the use of synthesis gas resulting from hydrocarbon reforming in a fuel cell was well known in the art at the time of the invention, as evidenced by Wright et al. (see for example abstract), it would have been obvious to one having ordinary skill in the art at the time of the invention to use said generated synthesis gas of Gee in the fuel

cell of Wright et al., as doing so would have amounted to nothing more than to use a known material for its intended use in a known environment to accomplish an entirely expected result. Further examiner notes that an apparatus is not patentable where it is an obvious combination of two known elements, wherein each element lends to end products the desirable properties that each is known to produce when used alone and there exists no evidence of co-action between the elements that produces unexpected results. See *In re Fortess and Schoeneberg*, 152 USPQ 13 (CCPA 1966).

Wright additionally discloses that to use synthesis gas in a fuel cell, the system needs to include a water-gas shift reactor (C5/L62-68 and C7/L50-65) and a capturing system to temporarily store that hydrogen gas before supplying it to the fuel cell (C 1/L54-C2/L5).

Regarding limitations recited in claims 18-35 which are directed to a manner of operating disclosed system, neither the manner of operating a disclosed device (as described by including claim limitations in process language versus structural limitations) nor material or article worked upon (diesel fuel) further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art. See MPEP § 2114 and 2115. Further, process limitations do not have patentable weight in an apparatus claim. See *Ex parte Thibault*, 164 USPQ 666, 667 (Bd. App. 1969) that states "Expressions relating the apparatus to contents thereof and to an intended operation are of no significance in determining patentability of the apparatus claim."

***Response to Arguments***

3. Applicant's arguments filed 9/17/2010 have been fully considered but they are not persuasive.

a. On page 2, last 2 paragraphs, Applicant argues the following:

This is clearly unlike Gee which fails to teach or even fairly suggest feeding water and diesel fuel to a SCW reactor where the water and diesel fuel have been separately preheated to "a predetermined temperature equal to or greater than the critical temperature of water where the water is placed into a supercritical state within the SCW reactor" and "the SCW reactor reforms the diesel fuel into a synthesis gas comprising a mixture of hydrogen and carbon monoxide," as recited in claim 1.

Instead, Gee discloses burning preheated hydrocarbon in a combustion chamber and then injecting steam and oxygen into the combustion chamber to capture the hydrogen produced by the combustion of the hydrocarbon. See, U.S. Pat. No. 2,630,378, Col. 5, lines 10-21.

This cannot be fairly viewed as feeding water and diesel fuel to a SCW reactor where the water and diesel fuel have been separately preheated to "a predetermined temperature equal to or greater than the critical temperature of water where the water is placed into a supercritical state within the SCW reactor" and "the SCW reactor reforms the diesel fuel into a synthesis gas comprising a mixture of hydrogen and carbon monoxide," as recited in claim 1, because Gee merely discloses burning a hydrocarbon in a combustion chamber and then using steam, not supercritical water, to capture hydrogen produced by the combustion of the hydrocarbon. Further, Gee only discloses preheating the hydrocarbon to a temperature of 200-800 degrees F without disclosing preheating water.

Examiner respectfully disagrees. Gee discloses an apparatus for generation of synthesis gas comprising: a hydrocarbon (15), a water feed (34); a supercritical water (SCW) reactor (19); further including an oxygen feed (10) into the SCW reactor (19) (Gee reactor operates under supercritical temperature and pressure conditions) (col. 4, lines 17-31 and col. 6, lines 72-col. 7, lines 1-2); at least one preheater (17 & 18) (as illustrated) in thermal communication with said fuel (15) (col. 2, lines 42 – col. 3, line 1 and col. 4, lines 65 - col. 5, line 2), and a heater configured to heat water from said water feed (34) to a temperature of 730°F (col. 5, lines 64-69) (Gee's steam temperature above overlaps with the instantly claimed temperature range of: a temperature equal or greater than the critical temperature of water)

(=707°F)), and fuel from said fuel feed (15) to a predetermined temperature (200-800°F) (Gee's temperature range above overlaps with the instantly claimed temperature range of: a temperature equal to or greater than the critical temperature of water (=707°F)) before the water and the fuel are mixed (col. 5, lines 64-70) (as illustrated) (col. 4, lines 17-22); the preheated fuel, air and water continue to mix in mixing means/( near the inlet of reactor (19)); also, Gee illustrates that water (34) can premix with oxygen (10) (via line 33) and that fuel (15) can premix with oxygen (10) (inside 13), which is similar to the instantly claimed mixing means (see instant specification, page 11, last 4 lines).

In summary, Gee teaches a fuel preheater that is capable of preheating fuel to supercritical water temperature as set forth above (see col. 4, lines 17-31); and a preheater that is capable of preheating the steam to supercritical water temperature (col. 5, lines 64-69); and a supercritical water reactor (SWC) (col. 4, lines 17-31 and col. 6, lines 72-col. 7, lines 1-2) since Gee teaches that the pressure in the reactor can be up to 600 psi and higher. Furthermore, Applicant is arguing process limitations (i.e. configured to heat water and fuel individually to a predetermined temperature) which describe operational conditions and do not limit the invented apparatus. While features of an apparatus may be recited either structurally or functionally, claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997), see also *In re Swinehad*, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971); *In re Danly*, 263 F.2d 844, 847, 120

USPQ 528, 531 (CCPA 1959). "Apparatus claims cover what a device is, not what a device does." *Hewlett-packard Co. v. Bausch & Lomb Inc.*, 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original). MPEP 2114.

Therefore, since Gee's apparatus teach a preheater that is capable of preheating the respective streams to the instantly claimed temperature, then the prior art of Gee reads on the instant claims.

Finally, Gee does teach that his SWC reactor reforms fuel into synthesis gas (col. 1, lines 40 - col. 2, lines 1- 20). Hence, Gee's apparatus reads on the instantly claimed apparatus.

4. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

### ***Conclusion***

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the



shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAITY V. HANDAL whose telephone number is (571)272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. V. H./  
Examiner, Art Unit 1723

12/1/2010

/Alexa D. Neckel/  
Supervisory Patent Examiner, Art Unit 1723

**Search Notes****Application/Control No.**

10/723,543

**Examiner**

KAITY V. HANDAL

**Applicant(s)/Patent under  
Reexamination**

WOOTTON ET AL.

**Art Unit**

1723

**SEARCHED**

Class	Subclass	Date	Examiner
Updated	Search	11/23/2010	KH

**INTERFERENCE SEARCHED**

Class	Subclass	Date	Examiner

**SEARCH NOTES  
(INCLUDING SEARCH STRATEGY)**

	DATE	EXMR
Updated Key Word Search in EAST	11/23/2010	KH
Updated Inventorship Search	11/23/2010	KH